



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/550,761

01/09/2006

Eiji Kamiyama

ABE-034

4340

20374 7590 08/15/2007  
KUBOVCIK & KUBOVCIK  
SUITE 710  
900 17TH STREET NW  
WASHINGTON, DC 20006

EXAMINER

CULBERT, ROBERTS P

ART UNIT

PAPER NUMBER

1763

MAIL DATE

DELIVERY MODE

08/15/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/550,761

Applicant(s)

KAMIYAMA ET AL.

Examiner

Roberts Culbert

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 9/7/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 9/27/05; 7/6/07.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-3 and 14-16 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S.**

**Patent 6,323,108 to Kub et al.**

Regarding Claim 1, Kub et al. teach (See Figure 1 and related discussion) a bonded substrate fabricated to have its final active layer thickness of 200nm or lower by performing an etching process on a surface of an active layer formed over a support substrate by cleaving off a portion of an active layer wafer, for the purpose of controlling the thickness of said active layer, said etching process carried out by using a solution having an etching effect so as to achieve the etching by a range of 1nm to 1 $\mu$ m.

Regarding Claim 2, Kub et al. teach (See Figure 1 and related discussion) a manufacturing method of a bonded substrate having its final active layer thickness of 200nm or lower by performing an etching process on a surface of an active layer formed over a support substrate by cleaving off a portion of an active layer wafer, for the purpose of controlling the thickness of said active layer, said etching process carried out by using a solution having an etching effect so as to achieve the etching by a range of 1nm to 1 $\mu$ m.

Regarding Claim 3, Kub et al. teach a manufacturing method of a bonded substrate in accordance with claim 2, in which an etching rate in said etching process is not greater than 100nm/min.

Regarding Claim 14, Kub et al. teach a manufacturing method of a bonded substrate in accordance with claim 2, in which one of following steps is performed on said active layer surface of said bonded substrate before said etching process, said steps including: (1) a step of chemical mechanical

Art Unit: 1763

polishing process taking advantage of a chemical effect and a mechanical effect at the same time; (2) a step of hydrogen treating process for performing a heat treatment in a reducing atmosphere containing hydrogen; and (3) a step of forming a silicon oxide film over said active layer and then removing said silicon oxide film along with a damaged portion of said active layer, which has been created in said cleaving process.

Regarding Claim 15, Kub et al. teach a manufacturing method of a bonded substrate in accordance with claim 2, in which one of following steps is performed on said active layer surface of said bonded substrate after said etching process, said steps including: (1) a step of chemical mechanical polishing process taking advantage of a chemical effect and a mechanical effect at the same time; (2) a step of hydrogen treating process for performing a heat treatment in a reducing atmosphere containing hydrogen; and (3) a step of forming a silicon oxide film over said active layer and then removing said silicon oxide film along with a damaged portion of said active layer, which has been created in said cleaving process.

Regarding Claim 16, Kub et al. teach a manufacturing method of a bonded substrate in accordance with claim 2, in which one of following steps is performed on said active layer surface of said bonded substrate after and before said etching process, said steps including: (1) a step of chemical mechanical polishing process taking advantage of a chemical effect and a mechanical effect at the same time; (2) a step of hydrogen treating process for performing a heat treatment in a reducing atmosphere containing hydrogen; and (3) a step of forming a silicon oxide film over said active layer and then removing said silicon oxide film along with a damaged portion of said active layer, which has been created in said cleaving process.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 1763

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 4-7 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,323,108 to Kub et al. in view of JP 03219000 A to Otsuka et al.**

Regarding Claims 4-7, as applied above, Kub et al. teach the method of the invention substantially as claimed, but do not expressly teach an etching solution comprising ammonia and hydrogen peroxide of pH 9 or higher. Kub et al. teach KOH is used to etch silicon.

However, KOH and a solution of ammonia and hydrogen peroxide are simply well known alternatives for alkaline etching of silicon. For example, Otsuka et al. teach KOH and ammonia-hydrogen peroxide are old alternatives for alkaline silicon etching. It would have been obvious to one of ordinary skill in the art at the time of invention to the alternative etchants for silicon.

It has been held that substitution of one art-recognized equivalent for another is *prima facie* obvious. See *In re Fout*, 297, 213 USPQ 532 (CCPA 1982).

Regarding the pH of 9 or greater, since pH is a well known result-effective variable in the etching art based on concentration of components, it would have been obvious to one of ordinary skill to optimize. Further, changes in concentrations or other process conditions of an old process do not impart patentability unless the recited changes are critical, i.e., they produce a new and unexpected result. (See MPEP 2144.05) "Where the general conditions of a claim are disclosed in the prior art, it is not inventive

Art Unit: 1763

to discover the optimum or workable ranges by routine experimentation. See *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997).

**Claims 8-13 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,323,108 to Kub.**

Regarding Claims 8-13, as applied above, Kub et al. teach the method of the invention substantially as claimed, and teach that after the etching process, a thickness of the active layer is measured, (Col. 9, Lines 25-45) but do not expressly teach that based on the obtained measurement data, the etching process is repeated until the thickness of the active layer across its entire area comes near to a predetermined value of thickness.

However, Kub et al. teach that several layers may be used with intervening substrate layers to allow multiple sequential etch stop etching processes. (Col. 10, Lines 10-25) Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to perform measurement of the layer and repeating based on the measurement as a matter of forming the layer in multiple steps as recited with the desired thickness thus providing process control in the well known manner.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1763

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



R. Culbert  
Examiner  
Art Unit 1763